

10/069423

JC10 Rec'd PCT/PTO 17 FEB 2002

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Date: February 19, 2002

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ANTONELLA FUSILLO

(Name of person mailing paper or fee)

(Signature)

**TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED
OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371**
**Attorney's Docket No:
BERTELSHOFER**
INTERNATIONAL APPLICATION NO.
PCT/EP00/07142INTERNATIONAL FILING DATE
26 July 2000PRIORITY DATE CLAIMED
17 August 1999**TITLE OF INVENTION****TENSIONER FOR A TRACTION DRIVE****APPLICANT(S) FOR DO/EO/US****THOMAS BERTELSHOFER, ALFRED STRASSER, THOMAS EBNER & ANDREAS LANG**

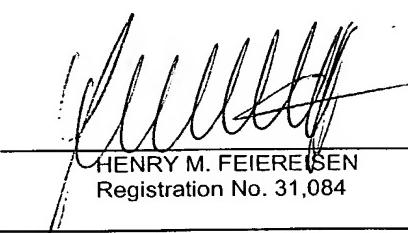
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.
2. This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
3. This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. has been transmitted by the International Bureau.
 - c. is not required, as the application was filed in the United States Receiving Office (RO/US)
6. A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. have been transmitted by the International Bureau.
 - c. have not been made; however, the time limit for making such amendments has NOT expired.
 - d. have not been made and will not be made.
8. A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. Original or facsimile of an oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. concern other document(s) or information included:

11. An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. A FIRST preliminary amendment.
 A SECOND or SUBSEQUENT preliminary amendment.
14. A substitute specification.
15. A change of power of attorney and/or address letter.
16. Other items or information: International Search Report and Form PTO-1449/ Form PCT/IB/308

JC13 Rec'd PCT/PTO 17 FEB 2002

U.S.APPLICATION NO. (if known, see 37 CFR 1.5) 10/069423	INTERNATIONAL APPLICATION NO. PCT/EP00/07142	ATTORNEY'S DOCKET NO. BERTELSHOFER																																																											
<p>17. [X] The following fees are submitted :</p> <p>BASIC NATIONAL FEE (37 C.F.R. 1.492(a)(1)-(5):</p> <table> <tr> <td>[X] For filing with EPO or JPO search report (37 C.F.R. 1.492(a)(5))</td> <td>\$ 890.00</td> <td>\$ 890.00</td> </tr> <tr> <td>[] International preliminary examination fee paid to USPTO (37 C.F.R. 1.492(a)(1))</td> <td>\$ 710.00</td> <td></td> </tr> <tr> <td>[] No international preliminary examination fee paid to USPTO (37 C.F.R. 1.492(a)(2)) but international search fee paid to USPTO (37 C.F.R. 1.445(a)(2))</td> <td>\$ 740.00</td> <td></td> </tr> <tr> <td>[] Neither international preliminary examination fee paid to USPTO (37 C.F.R. 1.492(a)(3)) nor international search fee paid to USPTO (37 C.F.R. 1.445(a)(2))</td> <td>\$1,040.00</td> <td></td> </tr> <tr> <td>[] International preliminary examination fee paid to USPTO (37 C.F.R. 1.492(a)(4)) and all claims satisfied provisions of PCT Articles 33(2)-33(4)</td> <td>\$ 100.00</td> <td></td> </tr> </table> <p>Surcharge of \$130.00 for furnishing the oath or declaration later than [] 20 [] 30 months from the earliest claimed priority date (37 CFR 1.492(e)).</p> <table> <thead> <tr> <th>Claims</th> <th>Number Field</th> <th>Rate</th> <th></th> </tr> </thead> <tbody> <tr> <td>Total Claims</td> <td>37-20</td> <td>x \$ 18.00</td> <td>\$ 306.00</td> </tr> <tr> <td>Independent Claims</td> <td>2-3</td> <td>x \$ 84.00</td> <td></td> </tr> <tr> <td>Multiple dependent claims (if applicable)</td> <td></td> <td>x \$280.00</td> <td></td> </tr> <tr> <td></td> <td></td> <td>TOTAL OF ABOVE CALCULATIONS</td> <td>\$1,196.00</td> </tr> </tbody> </table> <p>[] Applicant claims small entity status pursuant to 37 C.F.R. 1.27. Reduction by 1/2 for filing by small entity.</p> <table> <thead> <tr> <th colspan="2">SUBTOTAL</th> <th>\$1,196.00</th> </tr> </thead> <tbody> <tr> <td colspan="2">Processing fee of \$130.00 for furnishing the English translation later than [] 20 [] 30 months from the earliest claimed priority date 37 CFR 1.492(f).</td> <td></td> </tr> <tr> <td colspan="2"></td> <td>TOTAL NATIONAL FEE</td> </tr> <tr> <td colspan="2"></td> <td>\$1,196.00</td> </tr> <tr> <td colspan="2">Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +</td> <td>\$ 40.00</td> </tr> <tr> <td colspan="2"></td> <td>TOTAL FEES ENCLOSED</td> </tr> <tr> <td colspan="2"></td> <td>\$1,236.00</td> </tr> <tr> <td colspan="2">Amount to be refunded charged</td> <td></td> </tr> </tbody> </table>			[X] For filing with EPO or JPO search report (37 C.F.R. 1.492(a)(5))	\$ 890.00	\$ 890.00	[] International preliminary examination fee paid to USPTO (37 C.F.R. 1.492(a)(1))	\$ 710.00		[] No international preliminary examination fee paid to USPTO (37 C.F.R. 1.492(a)(2)) but international search fee paid to USPTO (37 C.F.R. 1.445(a)(2))	\$ 740.00		[] Neither international preliminary examination fee paid to USPTO (37 C.F.R. 1.492(a)(3)) nor international search fee paid to USPTO (37 C.F.R. 1.445(a)(2))	\$1,040.00		[] International preliminary examination fee paid to USPTO (37 C.F.R. 1.492(a)(4)) and all claims satisfied provisions of PCT Articles 33(2)-33(4)	\$ 100.00		Claims	Number Field	Rate		Total Claims	37-20	x \$ 18.00	\$ 306.00	Independent Claims	2-3	x \$ 84.00		Multiple dependent claims (if applicable)		x \$280.00				TOTAL OF ABOVE CALCULATIONS	\$1,196.00	SUBTOTAL		\$1,196.00	Processing fee of \$130.00 for furnishing the English translation later than [] 20 [] 30 months from the earliest claimed priority date 37 CFR 1.492(f).					TOTAL NATIONAL FEE			\$1,196.00	Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +		\$ 40.00			TOTAL FEES ENCLOSED			\$1,236.00	Amount to be refunded charged		
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<p>a. [X] A check in the amount of <u>\$1,236.00</u> to cover the above fees is enclosed.</p> <p>b. [] Please charge my Deposit Account No. <u>06-0502</u> in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.</p> <p>c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>06-0502</u>. A duplicate copy of this sheet is enclosed.</p> <p>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</p> <p>Send all correspondence to:</p> <p>HENRY M. FEIEREISEN 350 Fifth Avenue Suite 3220 New York, N.Y. 10118 (212) 244-5500 Date: February 19, 2002</p>  <p>HENRY M. FEIEREISEN Registration No. 31,084</p>																																																													

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Docket No.: BERTELSHOFER

In re Application of:)
THOMAS BERTELSHOFER et al.)
Int. Appl. No.: PCT/EP00/07142)
Int. Filing Date: July 26, 2000)
For: TENSIONER FOR A TRACTION DRIVE)

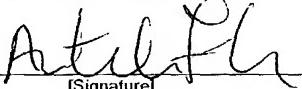
FIRST PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Express Mail mailing label number: **EV 063148864 US**
Date of Deposit: **February 19, 2002**
I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

ANTONELLA FUSILLO

[Name of person mailing paper or fee]


[Signature]

SIR:

Preliminary to the first Official Action in the above-entitled application,
please amend the application as follows.

The commissioner is hereby also authorized to charge any fees which may be required during the pendency of this application, including any patent application processing fees under 37 C.F.R. 1.17, and any filing fees under 37 C.F.R. 1.16, including presentation of extra claims, or credit any overpayment to deposit account no: 06-0502.

CLEAN VERSION OF REPLACEMENT PARAGRAPHS IN SPECIFICATION:

Replace paragraph [0005] as follows:

[0005] -- The afore-stated problem is solved according to the invention by a tensioner for a traction drive, in particular a belt drive, with a rotationally fixed housing having one end formed with a recess for arrangement of a bearing receptacle, for receiving and guiding an axle which is connected to a swivel arm arranged on the side of the housing, wherein a rotatable tension roller is arranged on the free end of the swivel arm and disposed upon the traction drive, and a torsion spring in concentric surrounding relationship to the bearing receptacle between the housing and the swivel arm for loading the swivel arm in the direction of an end position and thereby simultaneously axially spreading apart these components, wherein a friction disk is connected to the swivel arm and is urged in forced engagement with the housing for realizing a damped adjusting movement, characterized in that at least one elastic insert fills over an axial partial length of the torsion spring a circular ring shaped space which is radially defined by a portion of the housing and the torsion spring.--.

CLEAN VERSION OF ADDED CLAIMS:

19. (New) A tensioner for a traction drive, comprising:
 - a housing having an interior space;
 - a swivel arm, mounted on an axle which is guided by an inner housing wall, for supporting a rotatable tension roller interacting with the traction drive;
 - a torsion spring disposed in the interior space between the housing and the swivel arm for loading the swivel arm to seek an end position;
 - a friction disk connected to the swivel arm and urged in forced engagement with the housing for realizing a damped adjusting movement; and
 - at least one elastic insert received in the interior space between the torsion spring and a confronting surface of the inner housing wall and extending over an axial partial length of the torsion spring.
20. (New) The tensioner of claim 19, wherein the insert is placed between an inside area of the torsion spring and the inner housing wall.
21. (New) The tensioner of claim 20, and further comprising a second said insert placed in the interior space between an outside of the torsion spring and a confronting surface of an outer housing wall.
22. (New) The tensioner of claim 19, wherein the insert has an inner diameter which is smaller than an outer diameter of the inner housing wall.

23. (New) The tensioner of claim 19, wherein the insert has an outer diameter is greater than an inner diameter of the torsion spring.
24. (New) The tensioner of claim 19, wherein the insert has an inner diameter which is smaller than an outer diameter of the torsion spring.
25. (New) The tensioner of claim 19, wherein the insert has a tubular configuration.
26. (New) The tensioner of claim 25, wherein the insert, when viewed in half-section, has a U-shaped profile with walls substantially in parallel relationship.
27. (New) The tensioner of claim 26, wherein the walls of the insert have different lengths.
28. (New) The tensioner of claim 26, wherein one of the walls of the insert rests against the torsion spring and is provided with at least one elongate slot.
29. (New) The tensioner of claim 26, wherein one of the walls of the insert is shorter and circumscribes an outer surface area of the inner housing wall.
30. (New) The tensioner of claim 26, wherein one of the walls of the insert rests in a mid-section against the torsion spring.

31. (New) The tensioner of claim 20, wherein the insert has a calotte-shaped outer contour and defines an equatorial plane resting against the inside area of the torsion spring.
32. (New) The tensioner of claim 19, wherein the insert has an axial length which at least corresponds to a distance of three windings of the torsions spring.
33. (New) The tensioner of claim 21, wherein the second insert is received in an inner ring groove of the outer housing wall.
34. (New) The tensioner of claim 19, wherein the insert is non-detachable fixed to the inner housing wall.
35. (New) The tensioner of claim 19, wherein the insert is glued to the inner housing wall.
36. (New) The tensioner of claim 19, wherein the insert is made of plastic.
37. (New) The tensioner of claim 19, wherein the insert is made of PU-foam.

VERSION WITH MARKINGS TO SHOW CHANGES MADE:

IN THE SPECIFICATION:

Amend paragraph [0005] as follows:

[0005] -- The afore-stated problem is solved according to the invention by the features set forth in the characterizing part of claim 1 a tensioner for a traction drive, in particular a belt drive, with a rotationally fixed housing having one end formed with a recess for arrangement of a bearing receptacle, for receiving and guiding an axle which is connected to a swivel arm arranged on the side of the housing, wherein a rotatable tension roller is arranged on the free end of the swivel arm and disposed upon the traction drive, and a torsion spring in concentric surrounding relationship to the bearing receptacle between the housing and the swivel arm for loading the swivel arm in the direction of an end position and thereby simultaneously axially spreading apart these components, wherein a friction disk is connected to the swivel arm and is urged in forced engagement with the housing for realizing a damped adjusting movement, characterized in that at least one elastic insert fills over an axial partial length of the torsion spring a circular ring shaped space which is radially defined by a portion of the housing and the torsion spring.--.

Delete paragraph [0007] completely.

Delete page 13 completely.

Page 14, after the heading "CLAIMS" and before the first claim add --What is claimed is:--.

IN THE CLAIMS:

Add the following claims:

19. (New) A tensioner for a traction drive, comprising:
 - a housing having an interior space;
 - a swivel arm, mounted on an axle which is guided by an inner housing wall, for supporting a rotatable tension roller interacting with the traction drive;
 - a torsion spring disposed in the interior space between the housing and the swivel arm for loading the swivel arm to seek an end position;
 - a friction disk connected to the swivel arm and urged in forced engagement with the housing for realizing a damped adjusting movement; and
 - at least one elastic insert received in the interior space between the torsion spring and a confronting surface of the inner housing wall and extending over an axial partial length of the torsion spring.
20. (New) The tensioner of claim 19, wherein the insert is placed between an inside area of the torsion spring and the inner housing wall.
21. (New) The tensioner of claim 20, and further comprising a second said insert placed in the interior space between an outside of the torsion spring and a confronting surface of an outer housing wall.

22. (New) The tensioner of claim 19, wherein the insert has an inner diameter which is smaller than an outer diameter of the inner housing wall.
23. (New) The tensioner of claim 19, wherein the insert has an outer diameter is greater than an inner diameter of the torsion spring.
24. (New) The tensioner of claim 19, wherein the insert has an inner diameter which is smaller than an outer diameter of the torsion spring.
25. (New) The tensioner of claim 19, wherein the insert has a tubular configuration.
26. (New) The tensioner of claim 25, wherein the insert, when viewed in half-section, has a U-shaped profile with walls substantially in parallel relationship.
27. (New) The tensioner of claim 26, wherein the walls of the insert have different lengths.
28. (New) The tensioner of claim 26, wherein one of the walls of the insert rests against the torsion spring and is provided with at least one elongate slot.
29. (New) The tensioner of claim 26, wherein one of the walls of the insert is shorter and circumscribes an outer surface area of the inner housing wall.

30. (New) The tensioner of claim 26, wherein one of the walls of the insert rests in a mid-section against the torsion spring.
31. (New) The tensioner of claim 20, wherein the insert has a calotte-shaped outer contour and defines an equatorial plane resting against the inside area of the torsion spring.
32. (New) The tensioner of claim 19, wherein the insert has an axial length which at least corresponds to a distance of three windings of the torsions spring.
33. (New) The tensioner of claim 21, wherein the second insert is received in an inner ring groove of the outer housing wall.
34. (New) The tensioner of claim 19, wherein the insert is non-detachable fixed to the inner housing wall.
35. (New) The tensioner of claim 19, wherein the insert is glued to the inner housing wall.
36. (New) The tensioner of claim 19, wherein the insert is made of plastic.
37. (New) The tensioner of claim 19, wherein the insert is made of PU-foam.

REMARKS

This Amendment is submitted preliminary to the issuance of an Office Action in the present application.

Applicant submits herewith additional new claims 19 to 37 so as to encompass the full scope and breadth of the invention. The surcharge for presenting seventeen claims in excess of twenty is enclosed.

In addition, applicant has amended the specification to present it in proper form and language and to remove any reference to a particular claim number. No new matter has been added.

When the Examiner takes this application up for action, s/he is requested to take the foregoing into account.

Respectfully submitted,

By: _____


Henry M. Feiereisen
Agent for Applicant
Reg. No. 31,084

Date: February 19, 2002
350 Fifth Avenue
Suite 3220
New York, N.Y. 10118
(212) 244-5500
HMF:af

(12) NACH DEM VERTRÄG VON 20. JUNI 1970 FÜR DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

**(19) Weltorganisation für geistiges Eigentum
Internationales Büro**



(43) Internationales Veröffentlichungsdatum
22. Februar 2001 (22.02.2001)

PCT

**(10) Internationale Veröffentlichungsnummer
WO 01/13009 A1**

(51) Internationale Patentklassifikation⁷: F16H 7/12

(21) Internationales Aktenzeichen: PCT/EP00/07142

(22) Internationales Anmeldedatum:
26. Juli 2000 (26.07.2000)

(25) Einreichungssprache: Deutsch

(26) Veröffentlichungssprache: Deutsch

(30) Angaben zur Priorität:
299 14 381.3 17. August 1999 (17.08.1999) DE

(71) **Anmelder** (für alle Bestimmungsstaaten mit Ausnahme von US): INA WÄLZLAGER SCHAEFFLER OHG [DE/DE]; Industriestr. 1-3, D-91074 Herzogenaurach (DE).

(72) Erfinder; und

(75) Erfinder/Anmelder (nur für US): BERTELSHOFER,

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(81) Bestimmungsstaaten (*national*): DE, JP, KR, US.

(84) **Bestimmungsstaaten (regional):** europäisches Patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

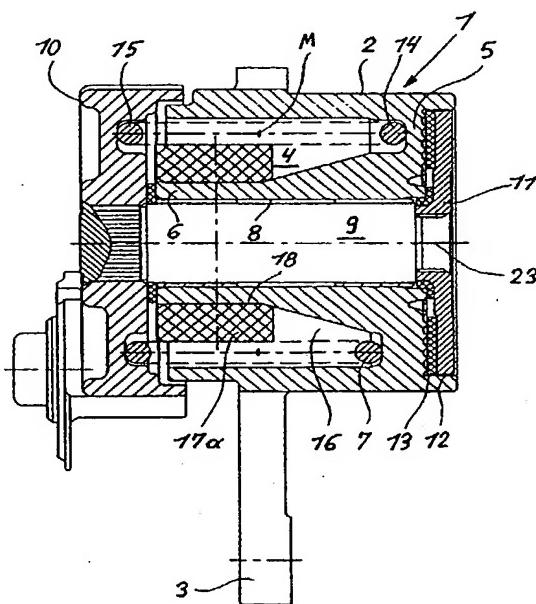
Veröffentlicht:

— *Mit internationalem Recherchenbericht.*

Zur Erklärung der Zweibuchstaben-Codes, und der anderen Abkürzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT-Gazette verwiesen.

(54) Title: TENSIONING DEVICE FOR A TRACTION MECHANISM DRIVE

(54) Bezeichnung: SPANNVORRICHTUNG FÜR EINEN ZUGMITTELTRIEB



(57) Abstract: The invention relates to a tensioning device (1) for a traction mechanism drive comprising a rotationally fixed housing to which a rotatable pivotal arm (10) provided with a tension roller is laterally assigned. A torsion spring (7) is inserted between the housing (2) and the pivotal arm (10) and exerts force upon the pivotal arm (10) towards a final position. In order to support the torsion spring (7), an insert (17a) is inserted in a circular ring-shaped space (16) that is radially delimited by a housing section and by the torsion spring (7).

(57) Zusammenfassung: Die Erfindung betrifft eine Spannvorrichtung (1) für einen Zugmitteltrieb mit einem drehstarren Gehäuse, dem seitlich ein drehbarer mit einer Spannrolle versehener Schwenkarm (10) zugeordnet ist. Zwischen dem Gehäuse (2) und dem Schwenkarm (10) ist eine Torsionsfeder (7) eingesetzt, die den Schwenkarm (10) in Richtung einer Endlage beaufschlagt. Zur Abstützung der Torsionsfeder (7) ist in einem kreisringartig gestalteten, von einem Gehäuseabschnitt und der Torsionsfeder (7) radial begrenzten Zwischenraum (16) ein Einlegeteil (17a) eingefügt.

5/prt>

TENSIONER FOR A TRACTION DRIVE

FIELD OF THE INVENTION

[0001] Tensioners find application in traction drives, in particular belt drives, for driving aggregates of an internal combustion engine. The tensioners, which are used to bias the traction drive, include a rotationally fixed housing mounted preferably to the internal combustion engine and having an end formed with a pot-shaped recess. A bearing receptacle placed centrally in the recess includes a longitudinal bore for insertion of an axle. On one end, the axle is connected in fixed rotative engagement with a swivel arm, which is swingably arranged on the side of the housing and has a free end provided with a rotatable tension roller. The other end of the axle is provided with a friction disk which is supported by the housing through forced engagement in concert with a torsion spring extending between the swivel arm and the housing.

BACKGROUND OF THE INVENTION

[0002] DE-32 25 411 C2 discloses such a tensioner. The torsion spring involved here is neither guided nor supported between the spring supports upon the housing and the swivel arm, respectively. Vibrations of the traction drive, generated, for example, by the internal combustion engine, which the traction drive is connected to, cause high-frequency adjusting movements of the swivel

arm which can produce disadvantageous resonant vibrations that destroy the torsion spring and result in a breakdown of the tensioner.

[0003] DE 44 26 666 A1 discloses a tensioner having a torsion spring which is mounted rotationally fixed between the housing and the swivel arm and has an inner side associated to a tension bush. The tension bush, which is provided with an elongate slot, is biased in radial direction and urged by a force to rest against the inner contour of the torsion spring, when installed. The tension bush is hereby made of a metallic material, in particular steel, and extends over a partial length of the torsion spring. A drawback is the generation of noise as a result of high-frequency adjusting movements of the swivel arm, which are damped or compensated by the torsion spring. This noise generation is encountered in a transition zone between the area supported by the tension bush and the free area where the spring winding bears against the tension bush or separates therefrom in rapid cycles. The effectiveness of the tension bush is governed by the radial bias. Therefore, installation, compressing of the tension bush require a complex assembly.

OBJECT OF THE INVENTION

[0004] The invention is therefore based on the object to provide a tensioner which:

- effectively prevents a fracture of the torsion spring;

- ensures a reliable support of the torsion spring without affecting the function of the tensioner;
- prevents a noise development;
- simplifies the assembly and
- can be manufactured in a cost-efficient manner.

SUMMARY OF THE INVENTION

[0005] The afore-stated problem is solved according to the invention by the features set forth in the characterizing part of claim 1.

[0006] Accordingly, at least one elastic insert is used for placement in a space bounded radially by a housing portion and by the torsion spring. The insert fills hereby the circular ring shaped space over an axial partial length of the torsion spring. The insert according to the invention effectively supports the torsion spring, so that a resonant vibration introduced into the tensioner does not lead to a breakdown of the torsion spring. Unlike the prior art in which the torsion spring is not supported at all or a relatively thin-walled tension bush bears against the inner contour of the torsion spring, the insert according to the present invention prevents, as a consequence of the filled space, the presence of great oscillation amplitudes that destroy the torsion spring. In accordance with the invention, the insert is so sized or dimensioned that the effectiveness and function of the tensioner remains unaffected. Thus, the reliability of the tensioner

is improved as the risk of spring fracture is eliminated. In addition to the effective damping of vibrations, the insert according to the invention results also in a noise attenuation because, even when the tensioner is subjected to a load, no noise is generated in view of a support of the torsion spring, made of steel, by the elastic insert, which is, preferably, made of plastic. The insert, which can be made in a cost-efficient manner, has, moreover, a weight advantage and can be handled manually in a simple way and installed without any need for an additional tool.

[0007] Configurations of the invention are the subject matter of the dependent claims 2 to 18, which will now be described.

[0008] The configuration of the invention provides for the installation of the insert into the installation space defined radially by the bearing receptacle and the torsion spring. As an alternative, it is also possible to dispose the insert in the installation space which is formed between the torsion spring and the inner housing wall. The effectiveness of the insert is hereby independent on the disposition after installation. Rather, the installation position can be determined in dependence on the given installation space or on the given installation conditions.

[0009] As an alternative, the invention also includes the use of dampening elements configured as inserts for support of the torsion spring on the inside or the outside.

[0010] The insert according to the present invention is so configured as to ensure in the entire working range of the tensioner a support of the torsion spring. Regardless of the deflection of the swivel arm, which causes a radial movement of the windings of the torsion spring, a radial abutment of the insert upon the torsion spring is continuously ensured, i.e. a radial overlap between the insert and the torsion spring.

[0011] In accordance with the invention, there is provided a forced engagement of an insert, which is placed between the torsion spring and the bearing receptacle. The dimensional configuration is hereby so selected that the outer diameter of the bearing receptacle exceeds the inner diameter of the insert. This measure realizes a radial overlap, which by itself is sufficient to effect a permanent positioning of the insert.

[0012] According to a further dimensional criterion for realizing a secure installation position of the insert resting on the inner side of the torsion spring, the outer diameter of the insert is greater than an adjusting inner diameter of the torsion spring upon installation. An insert disposed on the outside of the torsion spring has therefore an inner diameter which, when installed, is smaller than the adjusting outer diameter of the torsion spring upon installation.

[0013] Advantageously, the insert, which is made of suitable elastic material, is tubular or sleeve-shaped. Such a configuration can be manufactured

in a cost-efficient manner, does not require a targeted, i.e. positionally oriented installation, and simplifies the assembly.

[0014] The invention further includes an insert which has two walls, which, when viewed in half-section, are substantially in parallel relationship in installed position to form a U-shaped profile. The walls of such an insert configured as hollow profile are radially spread apart relative to one another, when not installed, so that the insert is securely positioned in place when the respective wall is urged in forced engagement upon the torsion spring and a respective wall area of the housing. Suited to the installation conditions at hand, the walls may have different lengths. An insert configured as hollow profile may further be provided with one or more elongate slots in the wall preferably directed to the torsion spring. As an alternative, the invention also includes circumferentially distributed elongate slots arranged alternately in the inner wall and the outer wall, to thereby precisely influence the contact force of the wall.

[0015] In tensioners with a housing having a bearing receptacle with an outer cylindrical portion to confine the length and to terminate in a conical transition, the insert configured as hollow body can be arranged with the shorter wall on the side of the bearing receptacle.

[0016] The configuration of the insert according to the present invention further includes an axial length which corresponds to a distance between at least

three spring windings. In this way, a desired support of the torsion spring can be realized in mid-section thereof, regardless of the installation position of the insert.

[0017] A further design of the invention provides for an insert with a calotte-shaped outer contour for support upon the torsion spring via a length-defining portion, an equatorial plane, when installed.

[0018] In addition to the described embodiment of inserts, the invention covers also further suitable geometric shapes which can be inserted in the space radially defined by the torsion spring and a housing portion.

[0019] The effectiveness of the insert according to the invention is assisted, when the insert is fixed in place on the side of the housing. Hereby, it is especially suitable, to fasten the insert to the housing side by gluing. The arrangement of a ring groove on the inner wall of the housing is further suitable to realize a form-fitting securement of the insert, when the insert embraces the outside of the torsion spring.

[0020] In accordance with the invention, a suitable material for the insert is plastic, in particular PU-foam. As an alternative, also plastics such as CR-foam, EPDM cellular rubber are suitable. This material has a sufficient wear resistance against movement of the torsion spring and permits also an effective damping of vibrations of the torsion spring.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] Several exemplified embodiments of the invention will now be described in more detail with reference to four figures. It is shown in:

[0022] FIG. 1 a longitudinal section through a tensioner according to the invention with a sleeve-like insert, placed between the bearing receptacle and the torsion spring;

[0023] FIG. 2 the tensioner of FIG. 1, provided in addition with a further insert disposed on the outside of the torsion spring;

[0024] FIG. 3 the tensioner with an insert configured as hollow body;

[0025] FIG. 4 the insert according to FIG. 3 with an outer wall provided with an elongate slot;

[0026] FIG. 5 the tensioner according to FIG. 1, provided with an insert having a calotte-like outer contour.

DETAILED DESCRIPTION OF THE DRAWINGS

[0027] FIG. 1 shows a longitudinal section of the configuration of a tensioner 1 according to the invention. The tensioner 1 includes a housing 1 which is secured on the outside via a bracket 3, for example, to an internal combustion engine, not shown in FIG. 1. The housing 2 forms a recess 4 which circumscribes rotationally symmetrically a bearing receptacle 6 and guides, i.a., a torsion spring 7. The bearing receptacle 6 extends from a bottom 5 of the housing 2 over the entire width of the housing 2. The central bore 8 of the bearing receptacle is provided for receiving an axle 9 for rotatably supporting a swivel arm 10 arranged on the side of the housing 2. On the end opposite to the swivel arm 10, the axle 9 is provided with a friction disk 11 which is fitted flush with its end face in a recess 12 of the housing 2 in correspondence with the outer contour of the friction disk 11. At the side of the housing, the friction disk 11 is supported by the housing 2 via a friction lining 13. The torsion spring 7 has spring ends 14, 15, which are positioned in a rotationally fixed manner in the housing 2 and in the swivel arm 10, respectively, and is constructed at the same time as compression spring. This spring configuration generates on the swivel arm 10 a force component which acts in axial direction, with the friction disk 11 being supported simultaneously in force-fitting manner by the housing 2. A space 16 is defined in radial direction by the outer contour of the bearing receptacle 6 as well as the torsion spring 7 and receives an elastic insert 17a which fills the space 6 over a partial length of the torsion spring 7. The size of the insert 17a is such that

its outer diameter exceeds the inner diameter of the torsion spring 7, when installed. Such a configuration ensures a permanent contact of the insert 17a against the inner contour of the torsion spring 7 and precludes or compensates thereby a disadvantageous characteristic vibration or resonant vibration of the torsion spring 7. The width of the insert 17a ensures a support of the torsion spring 7 in a mid-section "M". The dampening element configured as insert 17a is secured in place by fixing it via a contact surface 18 upon the outer surface area of the bearing receptacle 6 in a non-detachable manner, preferably through gluing.

[0028] In the further exemplified embodiments shown in FIGS. 2 to 5 the parts corresponding to the first exemplified embodiment (FIG. 1) are designated by same reference numerals so that repetitions can be avoided by referring to the embodiment of the first exemplified embodiment. The descriptions to FIGS. 2 and 5 are limited therefore to the different parts with respect to FIG. 1.

[0029] In FIG. 2, the tensioner 1 is provided in addition to the insert 17a resting upon the inside of the torsion spring 7 with a further insert 17b, which rests on the outside of the torsion spring 7. The insert 17b, which partially fills the space 19 is positively fitted in a ring groove 20 of the housing 2 and thus fixed in place with respect to the torsion spring 7. The size of the insert 17b is so selected that the outer diameter of the torsion spring 7 exceeds the inner diameter of the dampening element 17b in installed state so as to ensure a

sufficiently permanent abutment and loading of the insert 17 upon the outer contour of the torsion spring 7.

[0030] FIG. 3 shows the insert 17c which, as viewed in half-section, has two walls 21, 22 which form together a substantially U-shaped cross section. The wall 21, which has a greater length and is radially outwardly spread, has one end supported by the inside of the torsion spring 7. The wall 22 extends in concentric relationship to a longitudinal axis 23 of the tensioner 1 and is fixed via the cylindrical contact surface 18 to the bearing receptacle 6 and, preferably, secured in place by gluing.

[0031] FIG. 4 shows the insert 17d. In contrast to the insert 17c depicted in FIG. 3, the outer wall 21 of the insert 17d is provided with an elongate slot 24. The dampening element 17d may, for example, be provided with several elongate slots 24 spaced symmetrically about the circumference. The slotted wall 21 allows direct influence of the bias by which the insert 17d is supported upon the inside of the torsion spring 7.

[0032] FIG. 5 shows the insert 17e formed with a calotte-shaped outer contour. The insert 17e, which is placed in the space 16 and fills it partially, has an end face, which is directed to the swivel arm 10 and provided with an inwardly directed protrusion 25 for securing the insert 17e in place upon the outer surface area of the bearing receptacle 6. The protrusion 25 terminates in a arched

portion 26 whose equatorial plane bear upon the inside of the torsion spring 7. On the side facing away from the protrusion 25, the insert 17e is supported by a cone 27 of the bearing receptacle 6. The insert 17e may be constructed in a cost-efficient manner as a sleeve or a tubular section, with a length which exceeds the available installation space. Assembly results then in an outer calotte-shaped curvature.

LIST OF REFERENCE NUMERALS

1	tensioner	17a	insert
2	housing	17b	insert
3	bracket	17c	insert
4	recess	17d	insert
5	bottom	17e	insert
6	bearing receptacle	18	contact surface
7	torsion spring	19	space
8	bore	20	ring groove
9	axle	21	wall
10	swivel arm	22	wall
11	friction disk	23	longitudinal axis
12	recess	24	elongate slot
13	friction lining	25	protrusion
14	spring end	26	section
15	spring end	27	cone
16	space		

CLAIMS

1. Tensioner (1) for a traction drive, in particular a belt drive, with a rotationally fixed housing (2) having one end formed with a recess for arrangement of a bearing receptacle (6), for receiving and guiding an axle (9) which is connected to a swivel arm (10) arranged on the side of the housing (2), wherein a rotatable tension roller is arranged on the free end of the swivel arm (10) and disposed upon the traction drive, and a torsion spring (7) in concentric surrounding relationship to the bearing receptacle (6) between the housing (2) and the swivel arm (10) for loading the swivel arm (10) in the direction of an end position and thereby simultaneously axially spreading apart these components, wherein a friction disk (11) is connected to the swivel arm (10) and is urged in forced engagement with the housing (2) for realizing a dampened adjusting movement, characterized in that at least one elastic insert (17a to 17e) fills over an axial partial length of the torsion spring (7) a circular ring shaped space (16, 19) which is radially defined by a portion of the housing (2) and the torsion spring (7).
2. Tensioner according to claim 1, characterized in that the insert (17a) is placed in the space (16) which is radially defined by the bearing receptacle (6) and the torsion spring (7).

3. Tensioner according to claim 1, characterized in that the insert (17b) is placed in the space (19) which is defined by the torsion spring (7) and an inner wall of the housing (2).
4. Tensioner according to claim 1, characterized in that the tensioner (1) includes two inserts (17a, 17b) for placement in the spaces (16 and 19).
5. Tensioner according to claim 1, characterized in that the insert (17a, 17c, 17d) is so placed as to realize a radial overlap between the outer diameter of the bearing receptacle (6) and the inner diameter of the insert (17a, 17c, 17d).
6. Tensioner according to claim 1, characterized in that an outer diameter of the insert (17a, 17b, 17c, 17d) exceeds the inner diameter of the torsion spring (7) in installed state.
7. Tensioner according to claim 1, characterized in that in the installation state, the inner diameter of the insert (17b) is smaller than the outer diameter of the torsion spring (7).
8. Tensioner according to claim 1, characterized by a tubular insert (17a, 17b) placed in the tensioner (1).

9. Tensioner according to claim 1, characterized by a tubular insert (17c, 17d) which, when viewed in half-section, has a U-shaped profile with walls substantially in parallel relationship.
10. Tensioner according to claim 9, characterized in that the walls (21, 22) of the insert (17c, 17d) have different lengths.
11. Tensioner according to claim 9, characterized in that the wall (24) of the insert (17d), resting against the torsion spring (7), is provided with at least one elongate slot (24).
12. Tensioner according to claim 9, characterized in that the insert (17c, 17d) circumscribes in an installation position with the shorter wall (22) the outer surface area of the bearing receptacle (6).
13. Tensioner according to claim 9, characterized in that the insert (17c, 17d) is supported in an installation position with the wall (21) by a mid-section "M" of the torsion spring (7).
14. Tensioner according to claim 1, characterized by an insert (17e) which is so positioned upon the bearing receptacle (6) that their calotte-shaped outer contour is supported with an equatorial plane upon the inside of the torsion spring (7).

15. Tensioner according to claim 1, characterized in that the axial length of the insert (17a) at least corresponds to the distance of three windings of the torsions spring (7) in installed state.
16. Tensioner according to claim 3, characterized in that the insert (17b) fixed in place in a ring groove (20) of the housing (2) embraces the outside of the torsion spring (7).
17. Tensioner according to claim 1, characterized in that the insert (17a) is non-detachable fixed in place upon the bearing receptacle (6) in the area of a contact surface (18), in particular by gluing.
18. Tensioner according to claim 1, characterized in that a plastic, in particular a PU-foam, is provided as material for the insert (17a to 17e).

ABSTRACT

The invention relates to a tensioner (1) for a traction drive with a rotationally fixed housing (2) to a side of which a rotatable swivel arm (10), provided with a rotatable tension roller, is associated. A torsion spring (7) is placed between the housing (2) and the swivel arm (10) for loading the swivel arm (10) in the direction of an end position. Support of the tension spring (7) is realized by an insert (17a) placed in a circular ring shaped space (16) radially defined by a housing portion and the torsion spring (7).

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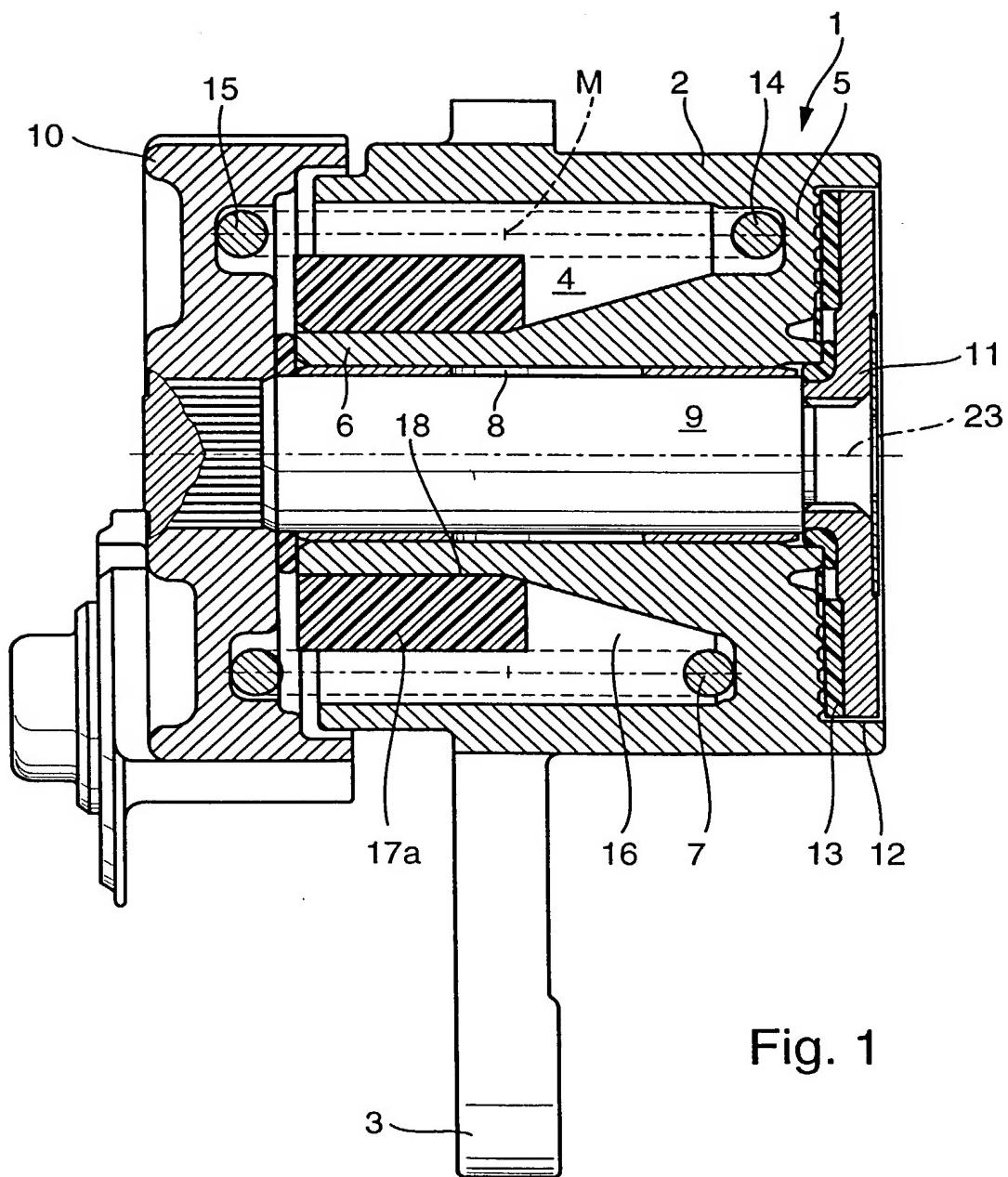


Fig. 1

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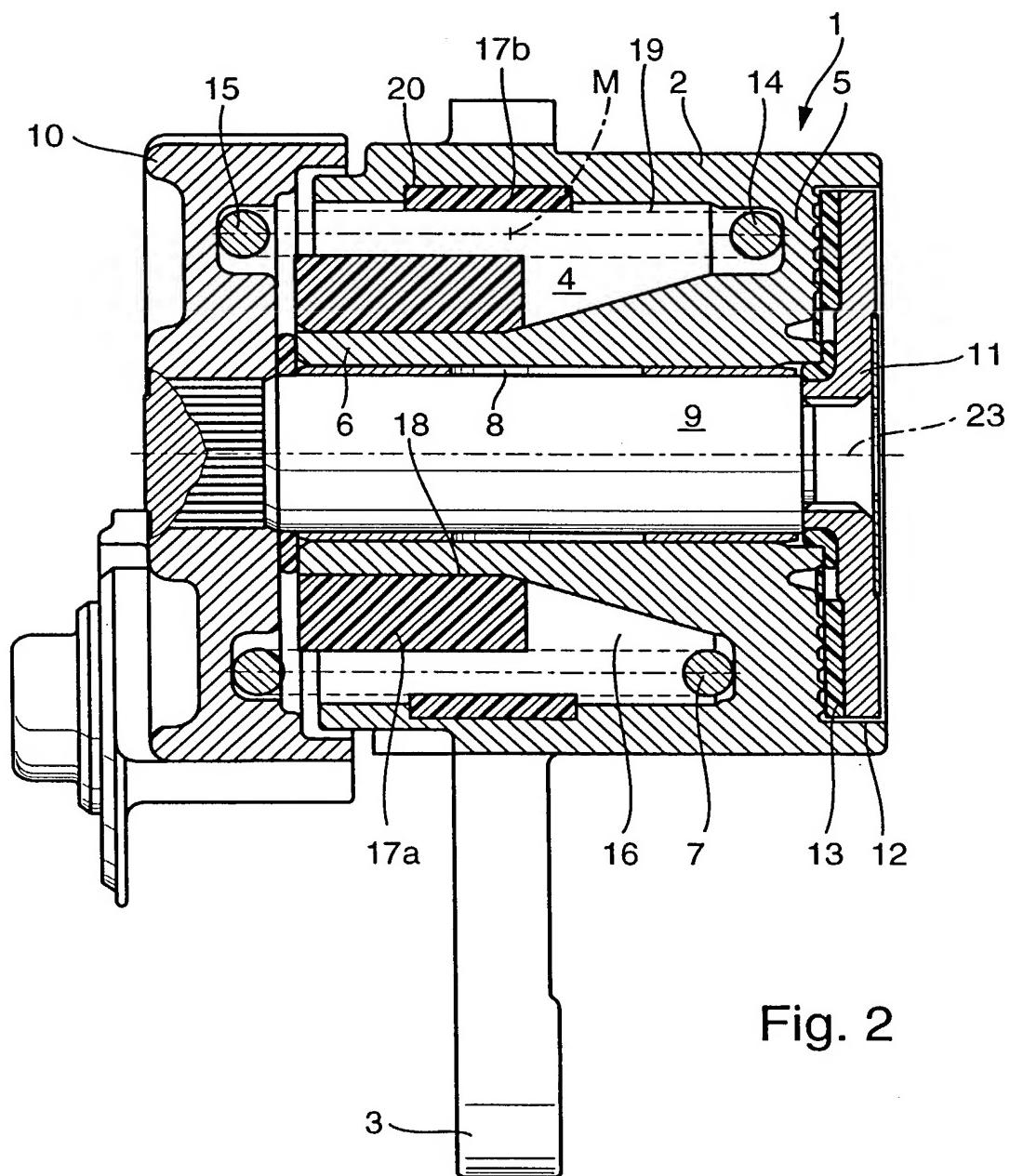


Fig. 2

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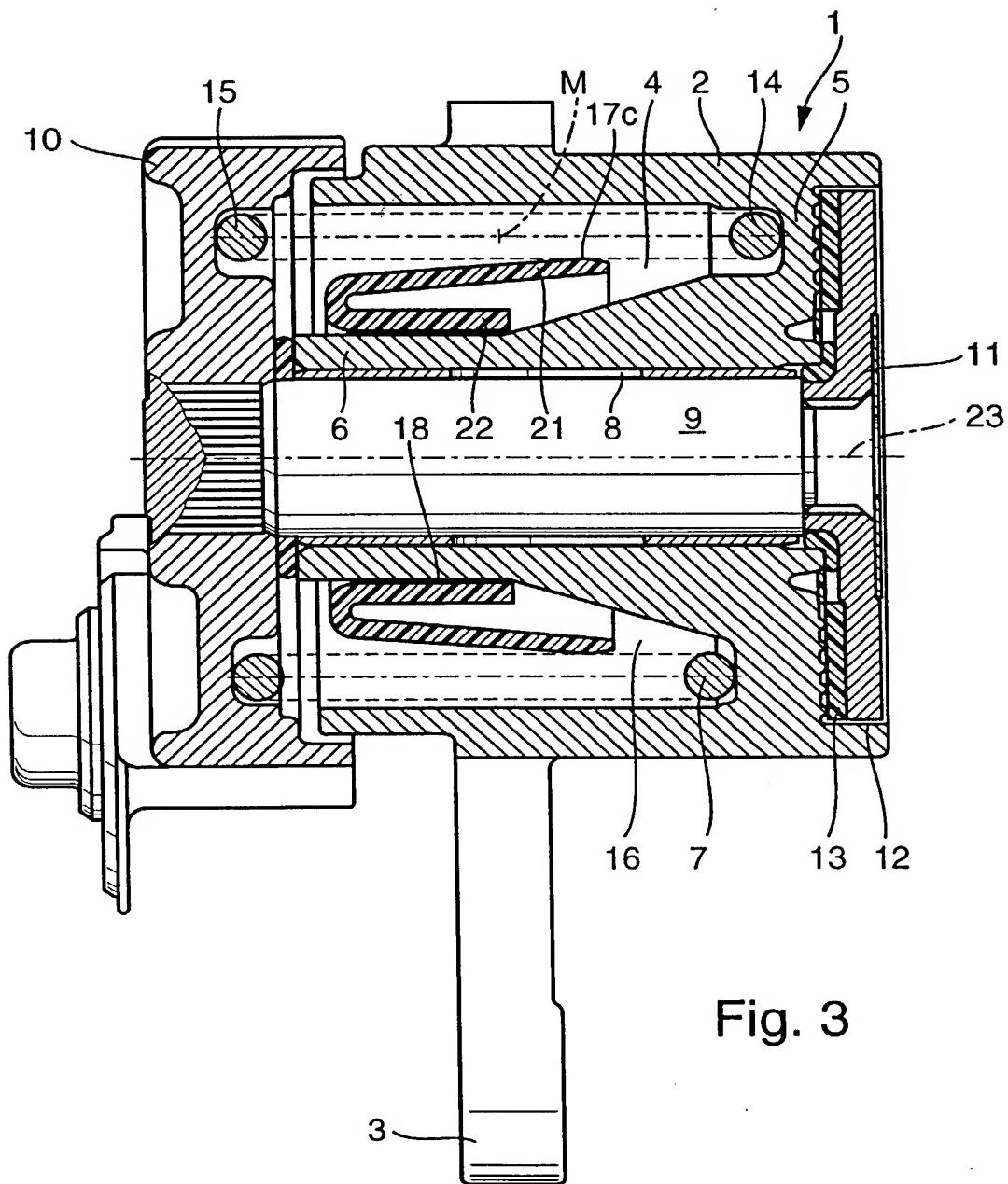


Fig. 3

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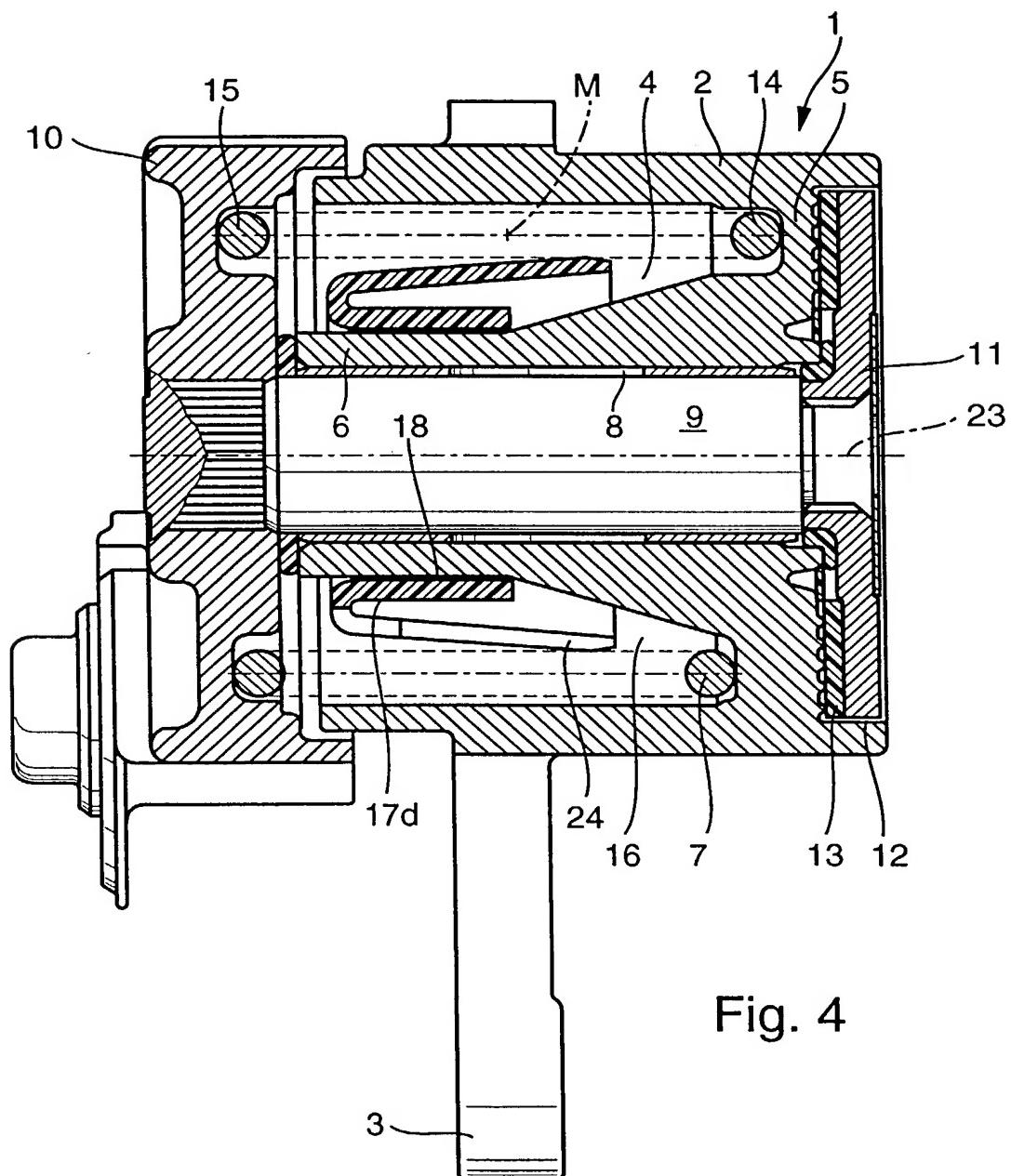


Fig. 4

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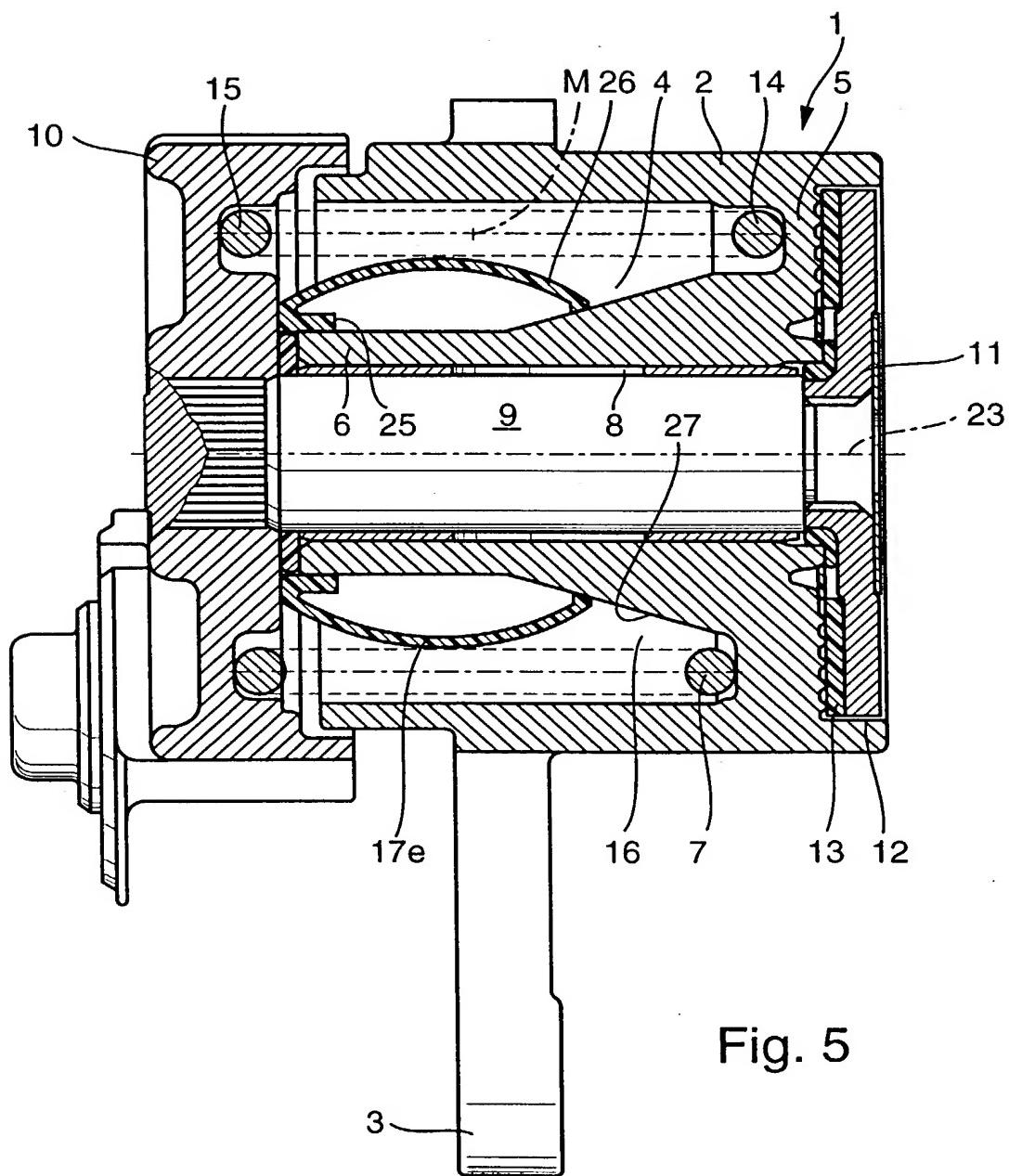


Fig. 5

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Erklärung für Patentanmeldungen mit Vollmacht
German Language Declaration**

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

daß mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

daß ich, nach bestem Wissen, der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

SPANNVORRICHTUNG FÜR EINEN ZUGMITTELTRIEB

deren Beschreibung
(zutreffendes ankreuzen)

- hier beigefügt ist.
 wurde angemeldet am 26. Juli 2000
 unter der U.S.-Anmeldungs Nr. oder unter der Internationalen Anmeldenummer im Rahmen des Vertrags über die Zusammenarbeit auf dem Gebiet des Patentwesens (PCT)
PCT/EP00/07142 und am _____ abgeändert (falls zutreffend).

Ich bestätige hiermit, daß ich den Inhalt der obigen Patentanmeldung einschließlich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag, wie oben erwähnt, abgeändert wurde.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen an, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Titel 37, Code of Federal Regulations, §1.56 von Belang sind.

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As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

TENSIONING DEVICE FOR A TRACTION MECHANISM DRIVE

the specification of which
(check one)

- is attached hereto
 was filed on 26 July 2000
 as United States Application Number or PCT International Application Number
PCT/EP00/07142 and was amended on _____
 (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119(a)-(d) or §365(b) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Applications
(Frühere ausländische Anmeldungen)

299 14 381.3 Germany
(Number) (Country)
(Nummer) (Land)

17/August/1999
(Day/Month/Year Filed)
(Tag/Monat/Jahr eingereicht)

Yes [] No
Ja Nein

(Number) (Country)
(Nummer) (Land)

(Day/Month/Year Filed)
(Tag/Monat/Jahr eingereicht)

[] Yes [] No
Ja Nein

Ich beanspruche hiermit gemäß Titel 35, US-Code, §119(e), den Vorzug aller unten aufgeführten US-Hilfsanmeldungen

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional application(s) below

(Application No. / Anmeldenr.)

(Filing Date / Anmelde datum)

(Application No. / Anmeldenr.)

(Filing Date / Anmelde datum)

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I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s), or §365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

(Appl. No.)
(Anmeldenr.)

(Filing Date)
(Anmelde datum)

(Status)
(patentiert, anhängig aufgegeben)

(Status)
(patented, pending abandoned)

(Appl. No.)
(Anmeldenr.)

(Filing Date)
(Anmelde datum)

(Status)
(patentiert, anhängig aufgegeben)

(Status)
(patented, pending abandoned)

Ich erkläre hiermit, daß alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und daß ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, daß wissentlich und vorsätzlich falsche Angaben gemäß §. 1001, Titel 18 US-Code strafbar sind und mit Geldstrafe und/oder Gefängnis bestraft werden können, und daß derartig wissentlich und vorsätzlich falsche Angaben die Rechtswirksamkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

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January 09, 2002

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